Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A plasma reactor for processing a semiconductor workpiece, comprising:

a reactor chamber having a chamber wall and containing a workpiece support for holding the semiconductor workpiece;

an overhead electrode overlying said workpiece support~~, said electrode comprising a portion of said chamber wall~~;

an RF power generator for supplying power at a frequency of said generator ~~to said overhead electrode and capable of maintaining a plasma within said chamber at a desired plasma ion density level~~;

said overhead electrode having a reactance that forms a resonance with the plasma at an electrode-plasma resonant frequency which is at or near said frequency of said generator;

~~an MERIE magnetic field generator for producing a magnetic field that rotates over time across a top surface of said workpiece.~~ <u>a magnetic field generator for producing a controllable magnetic field over the surface of said workpiece; and</u>

<u>a fixed impedance matching element coupled to said RF power generator and to said overhead electrode.</u>

Claim 2 (original): The reactor of Claim 1 wherein said magnetic field is sufficiently small in magnitude so that the

electron cyclotron frequency associated with said magnetic field is less than the frequency of said RF power generator.

Claim 3 (original): The reactor of Claim 2 wherein said electron cyclotron frequency is at least 5% less than said RF power generator frequency.

Claim 4 (original): The reactor of Claim 2 wherein said frequency of said RF power generator is a VHF frequency.

Claim 5 (original): The reactor of Claim 1 further comprising:

an insulating layer formed on a surface of said overhead electrode facing said workpiece support.

Claim 6 (original): The reactor of Claim 5 further comprising:

a capacitive insulating layer between said RF power generator and said overhead electrode.

Claim 7 (original): The reactor of Claim 6 further comprising:

a metal foam layer overlying and contacting a surface of said overhead electrode that faces away from said workpiece support.

Claim 8 (original): The reactor of Claim 5 further comprising a silicon-containing coating covering said insulating layer.

Claim 9 (original): The reactor of Claim 8 wherein said silicon-containing coating comprises one of silicon or silicon carbide.

Claim 10 (original): The reactor of Claim 7 wherein said insulating layer provides a capacitance sufficient to suppress arcing within said gas injection ports.

Claim 11 (original): The reactor of Claim 10 wherein said capacitive insulating layer has a sufficient capacitance to block D.C. current from a plasma within said chamber from flowing through said overhead electrode.

Claim 12 (original): The reactor of Claim 11 wherein:

said electrode has plural gas injection orifices therein generally facing said workpiece support; and

said metal foam layer is of a sufficient thickness to suppress an axial electric field within said gas injection orifices.

Claim 13 (currently amended): The reactor of Claim 5 wherein ~~said~~ said overhead electrode comprises aluminum and said insulating layer is formed by anodization.

Claim 14 (original): The reactor of Claim 6 wherein said capacitive insulating layer forms a capacitance that provides a low impedance path to ground through said overhead electrode for plasma sheath generated harmonics.

Claim 15 (original): The reactor of Claim 6 further comprising:

a gas inlet to said overhead electrode;

a gas baffling layer within said overhead electrode between said gas inlet and at least a first set of said gas injection orifices.

Claim 16 (original): The reactor of Claim 15 wherein said gas baffling layer comprises a layer of metal foam.

Claim 17 (original): The reactor of Claim 13 further comprising thermal control fluid passages within said overhead electrode.

Claim 18 (original): The reactor of Claim 17 further comprising an optical window in said overhead electrode generally facing said wafer support and a light carrying medium coupled to said window and extending through said overhead electrode.

Claim 19 (original): The reactor of Claim 5 wherein said plasma has a reactance and the reactance of said electrode corresponds to the reactance of said plasma.

Claim 20 (original): The reactor of Claim 19 wherein the reactance of said electrode is a conjugate of the reactance of said plasma.

Claim 21 (original): The reactor of Claim 19 wherein the reactance of said plasma comprises a negative capacitance, and wherein the capacitance of said electrode is the same magnitude as the magnitude of said negative capacitance of said plasma.

Claim 22 (original): The reactor of Claim 1 wherein the frequency of said RF generator and the electrode-plasma resonant frequency are VHF frequencies.

Claim 23 (original): The reactor of Claim 22 wherein said plasma reactance is a function of said plasma ion density and said plasma ion density supports a selected plasma process of

said reactor.

Claim 24 (original): The reactor of Claim 23 wherein said plasma process is a plasma etch process and wherein said plasma ion density lies in a range from about 10^9 ions/cubic centimeter to about 10^{12} ions/cubic centimeter.

Claim 25 (currently amended): The reactor of Claim 1 ~~further comprising a fixed impedance matching element connected between said generator and said overhead electrode,~~ wherein said fixed impedance match element ~~having~~ has a match element resonant frequency.

Claim 26 (original): The reactor of Claim 25 wherein the match element resonant frequency and said electrode-plasma resonant frequency are offset from one another and the frequency of said generator lies between said electrode-plasma resonant frequency and said match element resonant frequency.

Claim 27 (original): The reactor of Claim 26 wherein said frequency of said generator, said plasma frequency and said match element resonant frequency are all VHF frequencies.

Claim 28 (original): The reactor of Claim 25 wherein said fixed impedance match element comprises:

a strip line circuit having a near end thereof adjacent said overhead electrode for coupling power from said RF power generator to said overhead electrode and providing an impedance transformation therebetween, said strip line circuit comprising:

a strip line conductor generally above said overhead electrode and connected at a near end thereof to said overhead electrode,

a ground plane conductor above said overhead electrode and spaced from said inner conductor along the length thereof and connected to an RF return potential of said RF power generator,

a tap at a selected location along the length of said strip line conductor, said tap comprising a connection between said strip line conductor and an output terminal of said RF power generator.

Claim 29 (original): The reactor of 28 wherein said ground plane conductor comprises a ceiling of a housing overlying said overhead electrode, said strip line conductor formed along a winding path within said housing and beneath said ceiling.

Clam 30 (original): The reactor of Claim 29 wherein said strip line conductor is hollow, said reactor further comprising:

a gas feed line extending through said hollow strip line conductor for supplying process gas to said gas injection orifices in said overhead electrode.

Claim 31 (new): The reactor of Claim 1 wherein said VHF frequency is suitable for capacitively coupling plasma source power.